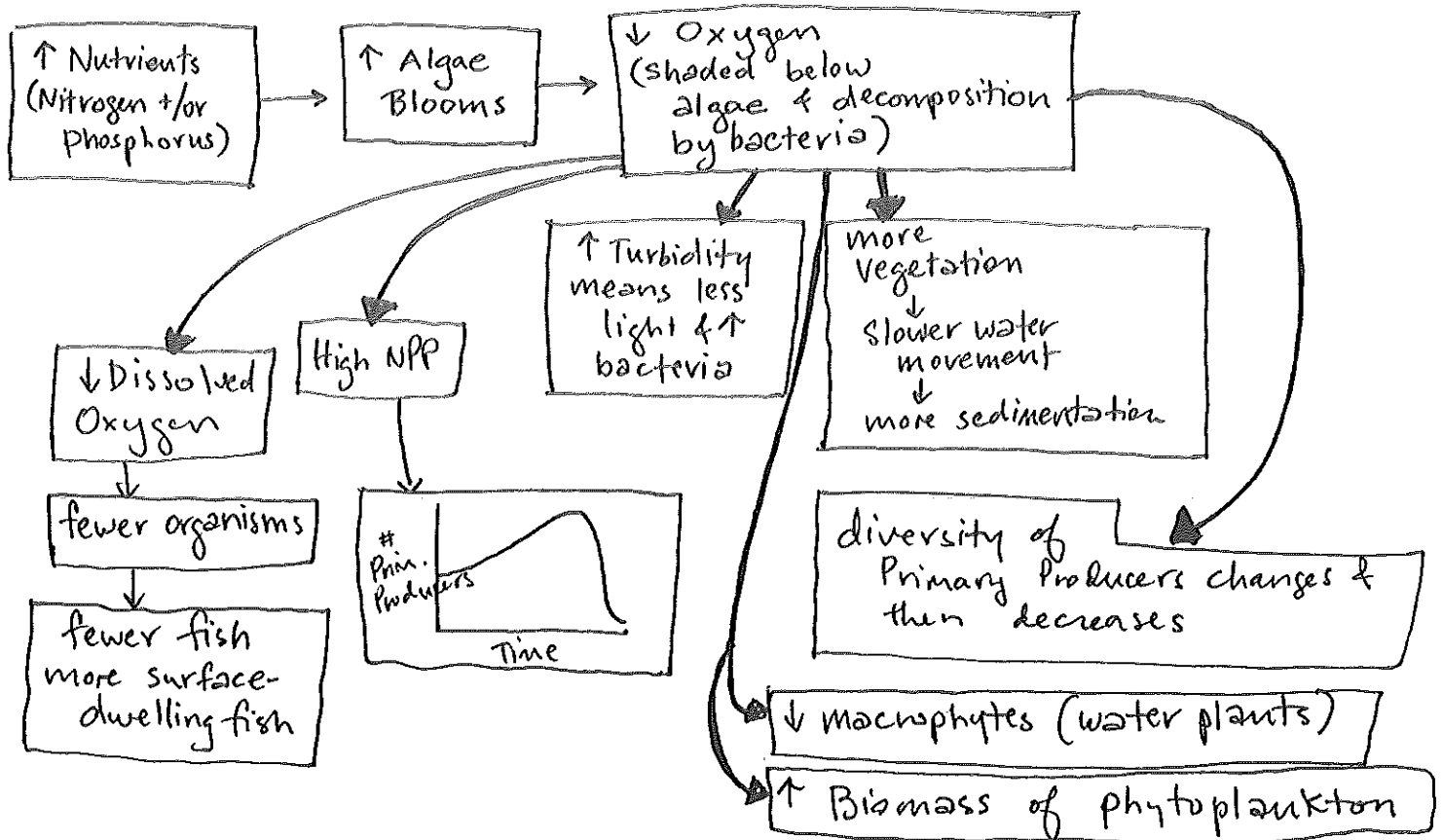


## Eutrophication

### 5.4.1 Outline the processes of eutrophication.



## The Bigger Picture

- ↳ Natural Eutrophication - involved in Primary Succession
  - As sediment, rainfall, & decay occur & waste enters the system → this all increases nutrients

"oligotrophic"

low nutrients  
low NPP

"eutrophic"

high nutrients  
high NPP

- ↳ Anthropogenic Eutrophication - Agricultural use of Fertilizers lead to runoff into waterways & groundwater.

### ↳ 2 Main Types of Nutrients

- Phosphorus - found in fertilizers, detergents, sewage
- Nitrogen -  $NO_x$  (from atmosphere); found in fertilizers (leach into groundwater, washing of feces into waterways, erosion of top soil)

#### 5.4.2 Evaluate the impacts of eutrophication

3 Main Reasons why Nitrogen in Rivers & Groundwater are an issue

① Eutrophication  
(see previous page)

② Loss to Farmers  
When farmers use fertilizers it is meant to ↑ their yield & thus their \$. If they don't plant immediately on the land then it will wash off.  
Nutrients also leach through the layers of soil & into the ground water.

- ① N compounds can cause algae blooms
- ② loss of fertilizers are economic hardship.
- ③ High Nitrate concentrations in drinking water can impact human health.

③ Human Health Concerns

- ↑ Nitrates in Stomach Cause ↑ Stomach Cancer
- ↓ oxygen can lead to "blue baby syndrome"

### 5.4.3 Describe and evaluate pollution management strategies with respect to eutrophication

#### Human Activity Producing Pollutant

- Avoid N Fertilizers but. mid-Sept & mid-Feb when soils are wet & leaching is ↑.
- use crops that absorb N @ a higher rate
- maintain crop cover since there is ↑ runoff without crop cover.
- don't apply fertilizers where erosion is a problem.
- don't apply fertilizers right before heavy rains.
- don't plough up grass.

#### Release of Pollutant into Environment

- Most phosphorus comes from sewage → carry out phosphate stripping to remove phosphate.
- Domestic Campaigns to encourage people to:
  - use  $\phi$  to low phosphate detergents
  - wash only full loads
  - reduce use of fertilizers on lawns
  - Compost
  - Collect pet feces

#### Clean-Up Strategies

- Precipitate Phosphates
- Removal of N-enriched sediments
- Removal of Biomass (algae blooms & water plants)
- Introduce water plants to take up extra nutrients.

#### Prevention

vs.

#### Clean Up

- divert waterway
- Precipitation is cheap

- Removal of N-enriched sediments
- Biomass Stripping is Expensive